Before the
Federal Communications Commission
Washington, D.C. 20554

In the matter of	)	
	)	
Modification of Parts 2 and 15 of the	)	
Commission's Rules for unlicensed devices	)	ET Docket No. 03-201
and equipment approval.	)	
	)	

To: The Commission

Petition for Limited Reconsideration

Cellnet Technology, Inc. ("Cellnet")[1] hereby petitions the Commission for limited reconsideration of the *Report and Order* released on July 12, 2004 in the above-referenced proceeding.[2] For the reasons discussed below, Cellnet urges the Commission to confirm the critical importance of cooperative sharing in the unlicensed bands, and particularly in the heavily utilized 902-928 MHz band, and, to the extent necessary, to adopt a spectrum etiquette processes

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[1] Cellnet is the leading provider of real-time automated meter reading ("AMR") and automation solutions to the utility industry. Based in Atlanta, Georgia, Cellnet supplies gas, water, and electric utilities with highly reliable, field-proven products that enable them to communicate with residential and commercial and industrial meters using wireless and IP network communications. Using a combination of Part 101 Multiple Address System ("MAS") licenses and spread spectrum Part 15 devices, Cellnet has created a low-cost, private internal telemetry services network which allows it to transmit and receive data for the remote monitoring and control of devices, primarily utility meters. Cellnet utilizes the 902-928 MHz band for its unlicensed local area network connecting the endpoint (meter) devices to the MAS network. Cellnet is dedicated to combining its leading technology and vast industry experience to continue to provide the industry with the most reliable and proven AMR solutions available.

[2] 19 FCC Rcd. 13,539, FCC 04-165, 69 Fed. Reg. 54,027 (Sept. 7, 2004)(the "R&O"). Cellnet did not participate in the comment phase of this proceeding because, having long employed devices operating in the 902-928 MHz band with very few incidents of interference – over 10 million endpoints are currently installed – Cellnet had every reason to believe that the history of cooperative, efficient sharing of the band would continue under the current sharing guidelines of Section 15.5, without the need for a government-imposed new spectrum etiquette. Moreover, at the time comments were being filed, Cellnet had virtually no experience in the field with devices utilizing digital modulation in the 902-928 MHz band. Over the last year, however, Cellnet has seen an increase in the number of devices utilizing digital modulation techniques in this band and, more significantly, in the number of such devices that are operating without any duty cycle. Cellnet also has had some limited experience with the potentially greater threat of harmful interference that these types of devices present. Although the company generally has had success in working through such incidents with the offending operator, Cellnet's interest in assuring the continued availability of this band for all types of uses, and the apparent need at this point for even stronger Commission action to assure such uses, warrants its participation in this proceeding at this time.

as suggested by several of the comments in this proceeding, but rejected by the Commission in the R&O. Such actions are necessary to assure users taking advantage of newly authorized technical flexibility in this heavily encumbered band do not create the type of interference that will deny the continued effective use of this band by existing and future users.

Cellnet and its predecessors have actively participated in many FCC proceedings dealing with the use of the 902-928 MHz band, principally to assure that it remains a viable band for low-power, efficiently engineered systems on a heavily shared basis. In its own right and as part of the Part 15 Coalition in PR Docket No. 93-61, Cellnet actively and successfully urged the Commission not to authorize a licensed service in the 902-928 MHz band that would destroy the band's viability for low-powered unlicensed operations. The Commission responded by carefully crafting a licensing scheme that generally assured the continued value of this band for a variety of unlicensed products and technologies. As the Commission stated over half a decade ago, "several million Part 15 devices have been sold and are being used every day to provide a wide variety of valuable services to the American public," further recognizing that "[i]n addition to the enormous benefits to both businesses and consumers that will result from the continued growth in the use of the Part 15 industry, our nation's economy also benefits due to the continued development of these new, advanced radio technologies by American companies."[3]

Over the last five years, the 902-928 MHz band has continued to be one of the most prolific resources for the development of a panoply of wireless devices and systems that substantially improve this nation's safety and economic well being.[4] Indeed, as the Commission

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[3] *Amendment of Part 90 of the Commission's Rules to Adopt Regulations for Automatic Vehicle Monitoring Systems*, PR Docket No. 93-61, *Report and Order*, 10 FCC Rcd 4695, 4699-4700 (1995) ("*LMS Report and Order*").

[4] Cellnet, for example, has installed over 10 million end points in its expanding network of AMR services, substantially aiding the efficiency and effectiveness of our nation's energy utilities at a time when energy prices and availability are important issues for both federal and state policy makers.

has recognized in the R&O, "[a] wide variety of devices have been introduced under these rules for business and consumer use, including improved cordless telephones and computer local area networks. Moreover, the introduction of industry standards, such as IEEE 802.11 and Bluetooth, promise to increase both the number and variety of devices that will operate on an unlicensed basis. Overall, the Part 15 rules have been highly successful in fostering the development of new unlicensed devices while protecting authorized users of the radio spectrum from harmful interference."[5]

Over the last few years, the Commission has further enhanced the opportunity to use these bands by allowing digital modulation techniques and, in the instant R&O, by accommodating advanced antenna technologies for increased spectrum efficiencies. In each case, the Commission has expanded the use of these bands on the underlying assumption that doing so would not pose any additional risk of interference. For example, responding to concerns that the proposals to allow digital modulation techniques in this band would cause interference to existing devices, the Commission determined that "there is no evidence that new digital systems are more likely to operate in a fashion to cause interference to incumbent technologies."[6] Indeed, unable to reach a similar conclusion in this proceeding, the Commission refused to extend certain flexibility for frequency hopping systems to the 915 MHz band, finding that "we do not have sufficient information about the affects [sic] that modifying the spacing requirements would have on existing users of the band."[7]

It cannot be denied that manufacturers designing products using the 902-928 MHz band have an exemplary record to date of creating a highly efficient approach to spectrum utilization,

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[5] R&O, para. 4.

[6] *Amendment of Part 15 of the Commission's Rules Regarding Spread Spectrum Devices*, ET Docket No. 99-231, *Second Report and Order*, 17 FCC Rcd. 10,755, 10,760 (2002) ("Second R&O").

and without substantial governmental oversight. Cellnet's approach is typical, utilizing spread spectrum technologies and a cellular-like LAN system design; this design assures that even in the presence of potentially interfering signals from a variety of other devices operating even in close proximity, critical information will ultimately and timely be received for its AMR services. Cellnet has done so in light of the FCC's general conditions for operation for an unlicensed device (found in Section 15.5 of the FCC's rules) that operation of an intentional, unintentional, or incidental radiator is subject to the conditions that no harmful interference is caused and that interference must be accepted that may be caused by the operation of an authorized radio station, by another intentional or unintentional radiator, by industrial, scientific and medical (ISM) equipment, or by an incidental radiator. Cellnet has also been mindful that the operator of a radio frequency device shall be required to cease operating the device upon notification by a Commission representative that the device is causing harmful interference.[8]

It is also noteworthy that the Part 15 regulations are clear in imposing a high degree of care on manufacturers of unlicensed devices operating in this band. Section 15.15 clearly requires that "[a]n intentional or unintentional radiator shall be constructed in accordance with good engineering design and manufacturing practice. Emanations from the device shall be suppressed as much as practicable, but in no case shall the emanations exceed the levels specified in these rules."[9] Moreover, the same rule clearly recognizes that

> [p]arties responsible for equipment compliance should note that the limits specified in this part will not prevent harmful interference under all circumstances. Since the operators of Part 15 devices are required to cease operation should harmful interference occur to authorized users of the radiofrequency spectrum, the parties responsible for equipment compliance are encouraged to employ the minimum field strength necessary for communications, to provide greater attenuation of unwanted emissions than required

[7] R&O, para. 50.
[8] 47 C.F.R. Sections 15.5 (b), (c).
[9] 47 C.F.R. Section 15.15(a).

by these regulations, and to advise the user as to how to resolve harmful interference problems.[10]

In many respects, then, a spectrum etiquette requirement among Part 15 devices already exists: good engineering design is required, with emissions suppressed as much as practicable, and with devices designed to use the minimum field strength necessary and maximum attenuation of unwanted emissions, and in any event, no harmful interference may be caused. But as many commenters in this proceeding have recognized, and despite the FCC's expectation that the newly authorized technical flexibility would not increase the likelihood of interference to incumbent devices in the band, the threat of increased interference may now warrant even more.

Indeed, Cellnet has identified in recent months a potentially disturbing trend of manufacturers of devices utilizing digital modulation to develop products that do not utilize any duty cycle and that operate at the maximum permitted limits, without regard to the above-referenced requirements. As a result, new entrants to the band are creating emissions at interfering levels that are virtually unavoidable by incumbent devices, no matter how well, efficiently or cleverly the incumbent devices may have been designed to operate in the presence of other low powered users. While it is true that incumbents must accept interfering signals, it must be equally true that new entrants may not create harmful interference, particularly when they may not be employing good engineering designs and/or designs that utilize the minimum power and the maximum suppression of signals necessary to provide the desired services. Indeed, in such circumstances, it is essential for both sides to take all commercially reasonable steps to avoid the creation of, and susceptibility to, any harmful interference that is being created. Cellnet urges the Commission to use reconsideration in this proceeding to confirm this simple, but vital requirement.

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[10] 47 C.F.R. Section 15.15(c).

In the past, the FCC has strongly encouraged manufacturers and marketers of unlicensed devices to work cooperatively when instances of harmful interference occur and the source is readily identified. Cooperation is a significantly better approach for both sides, and typically provides better results than can be expected if the FCC becomes involved. On the other hand, as more flexibility has been provided, and even more new entrants to this band are enjoying this flexibility, it is becoming increasingly clear that further FCC guidance is necessary, either in the form of a spectrum etiquette or, at the very least, a STRONG affirmation of the importance of developing products that can share this band efficiently and effectively.

As Microsoft aptly noted in its comments in this proceeding, "[c]onsumers and enterprises are using unlicensed technology to build critical wireless networks, and the reliability of these networks is an important concern. ... Sharing rules are far more necessary in bands where signals propagate better and there are fewer available channels. ... it has become increasingly important to address horizontal sharing so devices that are Part 15-compliant – but needlessly waste spectrum – do not degrade the reliability and utility of other unlicensed networks."[11] Itron, Inc., another manufacturer of AMR systems, also recognized the need for the Commission to assert a rational control over operations in this band; Itron urged a simple limit on the transmit duty cycle of digital modulation devices operating in the 902-928 MHz band in order to assure that other devices operating co-channel or adjacent channel to digitally modulated devices would have some time, even milliseconds, in which to utilize the channel as well.[12] As Itron noted, "[u]nlicensed devices in the 902-928 MHz band traditionally have managed to

[11] Comments of Microsoft Corporation at 3-4. Microsoft suggested that while vertical sharing protection, *i.e.*, unlicensed to licensed, has always existed, the FCC has not imposed "horizontal" sharing obligations, *i.e.*, unlicensed to unlicensed protection. Cellnet does not agree. While the FCC generally has assumed that new rules and requirements would not create interference among unlicensed devices, section 15.5 by its terms flatly prohibits the creation of harmful interference, and not just to licensed services, and section 15.15 clearly requires all such devices to operate at the minimum levels necessary to avoid the creation of harmful interference.

coexist not only because they operate at low power, but also because they transit for limited periods. Hence a limitation on duty cycle ensures that the band will not become overcrowded with high power, high duty cycle products to the detriment of the tens of millions of low power, low duty cycle devices already in operation."[13]

In the R&O, however, the Commission declined to impose any type of spectrum etiquette in the unlicensed bands "because they are already heavily used."[14] Moreover, to support its decision, the FCC acknowledges that "design flexibility has helped industry to develop efficient sharing and modulation schemes" further noting that "existing regulations have resulted in very efficient use of available unlicensed spectrum."[15] While the underlying premise is correct, the conclusion is not: indeed, unless on reconsideration the FCC confirms that newly designed unlicensed devices must be appropriately engineered to avoid interference to incumbent unlicensed devices AND that they must cooperate to fix any harmful interference that nevertheless exists, the absence of any duty cycle limitation on digitally modulated devices threatens to destroy the effective use of the band in many areas where newly installed systems are operating continuously at 24/7 at power levels and across bandwidths that simply cannot be avoided by incumbent transceivers.

The introduction of digital modulation techniques and other regulatory flexibility such as that provided in this proceeding unbridled by any responsibility to avoid harmful interference to other uses, while clearly enhancing the potential use of this band, also has the potential to create material adverse effects on the millions of devices that the Commission so proudly recognizes in

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[12] Comments of Itron, Inc. at 8.
[13] *Id.*
[14] R&O, para. 54.
[15] *Id.*

the R&O.[16] Cellnet therefore urges the FCC to reconsider its decision to take no steps towards a spectrum etiquette, and instead (a) adopt a duty cycle limitation and other effective spectrum etiquette on any newly certified devices operating in this band that use digital modulation techniques; and (b) promptly confirm, in a public notice, the obligation of all operators of unlicensed devices authorized under Part 15 to avoid harmful interference to licensed and unlicensed devices operating in the band and to work cooperatively with operators of any other devices that may be experiencing such interference to resolve any such incidents to the mutual satisfaction of all parties concerned.

Respectfully submitted,

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[16] Microsoft has noted that, as anticipated by the Commission in the R&O and the Second R&O, many of these newer entrants are offering broadband access to the Internet, a critical information service to many consumers in rural areas. In the absence of cooperation and/or a spectrum etiquette, the alternative may be the creation of numerous systems and networks competing at the maximum permitted levels which make the band virtually unusable for anyone. Such a "survival of the fittest" circumstance denies consumers many, if not all, of the benefits that have been enjoyed, rather than enhancing the band's use, and surely cannot be the result the Commission anticipated when it decided *not* to adopt any spectrum etiquette in this proceeding.